Claim

1. A process for the production of an olefin derivative, which process comprises the steps of:

(a) cracking a paraffinic hydrocarbon containing feedstock to produce a first dilute olefins stream comprising both olefins and alkanes,

(b) reacting at least a portion of said first dilute olefins stream produced in step (a) to produce a first olefin derivative stream, comprising a first olefin derivative, and a second dilute olefins stream, comprising alkanes and at least 5 mol% unreacted olefins,

(c) auto-thermally cracking at least a portion of said second dilute olefins stream produced in step (b), said portion comprising alkanes and at least 5 mol% unreacted olefins.

2. The process according to claim 1, wherein the first dilute olefins stream comprises at least 50wt% olefin and at least 1wt% alkane.

3. The process according to claim 1 or claim 2, wherein the cracking step (a) is selected from (i) thermal cracking processes, (ii) steam cracking processes and (iii) autothermal cracking processes.

4. The process according to any one of the preceding claims, wherein the paraffinic hydrocarbon containing feedstock fed to step (a) comprises a single alkane, such as ethane, a mixture of alkanes, such as NGL (natural gas liquids), or naphtha.

5. The process according to any one of the preceding claims, wherein the portion of the second dilute olefins stream passed to the autothermal cracker in step (c) comprises at least 50% of the alkane and at least 50% of the olefin in the second dilute olefins stream.

6. The process according to any one of the preceding claims, wherein the concentration of olefin (unreacted olefin from the second dilute olefins stream and additional olefin that may be present in any additional alkane-containing feed) in the feed passed to the auto-thermal cracking step is at least 4 mol%.

7. The process according to any one of the preceding claims, wherein the cracking step (a) is an auto-thermal cracking step, and the process for the production of an olefin derivative comprises the steps of:

(a) auto-thermally cracking a feed comprising a paraffinic hydrocarbon containing feedstock and a recycle stream to produce a first dilute olefins stream comprising both olefins and alkanes,

(b) reacting at least a portion of said first dilute olefins stream produced in step (a) to produce a first olefin derivative stream, comprising a first olefin derivative, and a second dilute olefins stream, comprising alkanes and at least 5 mol% unreacted olefins,

(c) recycling at least a portion of said second dilute olefins stream produced in step (b) as the recycle stream in the auto-thermal cracking step of step (a), said portion comprising alkanes and at least 5 mol% unreacted olefins.

8. A process for the production of an olefin derivative, which process comprises the steps of:

(a) cracking a paraffinic hydrocarbon containing feedstock to produce a first dilute olefins stream, comprising both olefins and alkanes,

(b) reacting at least a portion of said first dilute olefins stream produced in step (a) to produce a first olefin derivative stream, comprising a first olefin derivative, and a second dilute olefins stream, comprising alkanes and at least 5 mol% unreacted olefins,

(c) reacting at least a portion of said second dilute olefins stream produced in step (b), said portion comprising alkanes and at least 5 mol% unreacted olefins, to produce a second olefin derivative stream, comprising a second olefin derivative, and a recycle stream, comprising unreacted alkane and less than 5mol% olefins, and

(d) recycling said recycle stream produced in step (c) to the cracking step of step (a).